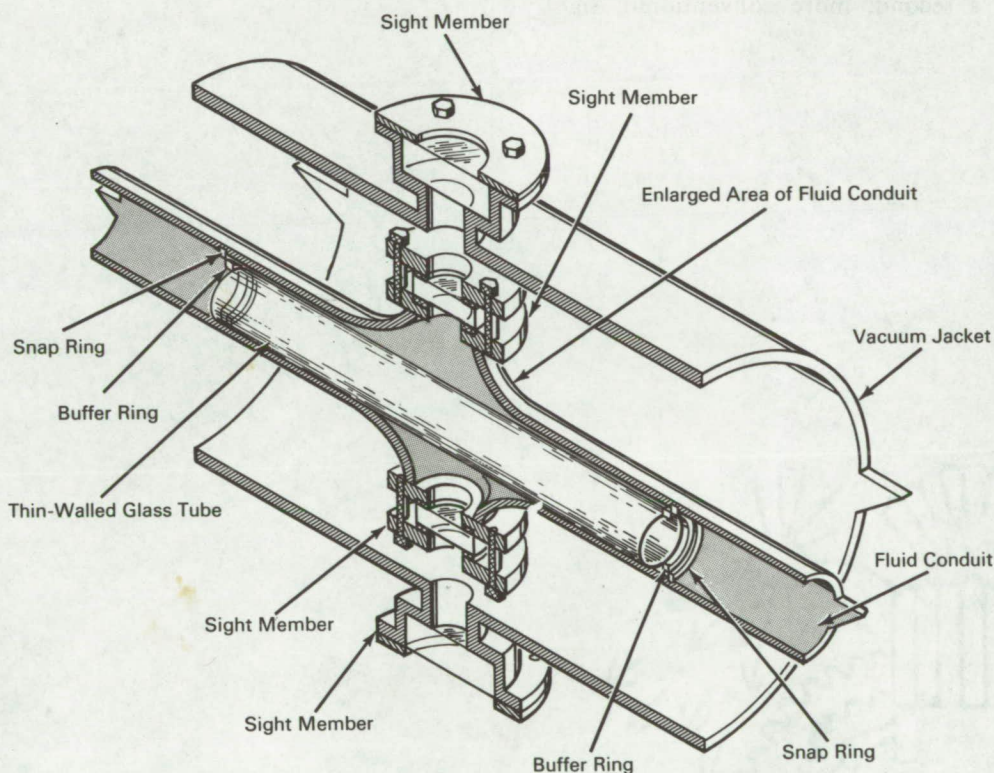


NASA TECH BRIEF



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High Pressure Cryogenic Liquid Flow Sight Assembly Provides Streamlined Flow for Easy Observation



The problem:

To observe cryogenic liquids flowing through a smooth pipe at pressures up to several hundred pounds per square inch. Previous methods usually necessitated bonding a section of glass pipe into the metal piping; a difficult and expensive operation because of differences in the coefficient of expansion of metal and glass under cryogenic conditions.

Also, the glass pipe must necessarily have an extremely heavy wall thickness to contain the pressures involved.

The solution:

A high-pressure cryogenic observation window assembly which houses a thin wall glass pipe held within a steel retainer.

(continued overleaf)

How it's done:

A thin wall glass cylinder is mounted within the T-joint assembly and connected into the metal piping to provide a continuous smooth flow path. Breakage of the sight tubing is eliminated by providing controlled leakage paths around the ends to equalize the interior and exterior pressure and to provide a streamlined fluid flow path which eliminates eddying and turbulence of the fluid. An observation window is also mounted in the T-joint assembly by a pressure seal with a lead gasket bearing on a serrated metal flange and held in compression by a bolt and nut arrangement. The T-joint observation window assembly is of high pressure construction and designed to contain the high pressure fluid surrounding the glass tubing. Since the hardware is exposed to cryogenic temperatures, this entire T-joint assembly is enclosed in an insulating vacuum environment by encapsulation in a second, more conventional, sight assembly unit.

Notes:

1. The sight assembly which consists of relatively inexpensive components can accommodate fluids under wide range of pressures and temperatures.
2. Inquiries concerning this invention may be directed to:

Technology Utilization Officer
Lewis Research Center
21000 Brookpark Road
Cleveland, Ohio 44135
Reference: B66-10394

Patent status:

This invention is owned by NASA, and patent application has been filed. Royalty-free, nonexclusive licenses for its commercial use will be granted by NASA. Inquiries concerning license rights should be made to NASA, Code GP, Washington, D.C. 20546.

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(Lewis-310)